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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/578,962	05/25/2000	Takashi Iwasaki	6920/0H207	7076

7590 12/31/2002

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EXAMINER
STOCK JR, GORDON J

ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 12/31/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/578,962	IWASAKI ET AL.
	Examiner	Art Unit
	Gordon J Stock	2877

-- Th MAILING DATE of this communication app ars on the cov r she t with the correspond nce address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 October 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 May 2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☒ The proposed drawing correction filed on *21 October 2002* is: a)☒ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

The Amendment and the Drawing Change filed on October 21, 2002 have been entered.

Drawings

1. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on 21 October 2002 has been approved. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the monochromator comprising one slit as claimed in claim 6 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

3. The specification is objected to for the following: the phrase, "output slit plage," of page 9 line 26 should read –output slit plate--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. **Claim 11** is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification discloses an invention that increases wavelength resolution by controlling the focal lengths and the slit widths of a monochromator (page 5, paragraph 4). To control these characteristics the specification discloses controlling the thermal expansion of the mirrors and the substrate in which the components of the monochromator are fixed; whereas, the coefficients of linear expansion of the mirrors and the substrate are similar by disclosing possible materials that the mirrors and substrate may comprise that have similar low coefficients of thermal expansion (page 5, paragraphs 4-6, pages 6-9). However, the specification teaches only the function of a grating (page 1, paragraph 5). The specification does not disclose any thermal or material property of the grating that further comprises an improvement in wavelength resolution. The invention solely comprises a monochromator with the improvement of thermal compensation comprising: mirrors and a substrate that the components are fixed having similar coefficients of linear expansion. The applicant's invention as disclosed does not teach one skilled in the art the thermal or material properties of the grating that would complement the thermal compensating properties of the mirrors and substrate to improve wavelength resolution upon temperature changes. Therefore, upon filing the application, the inventors solely had an invention with thermally compensating mirrors and substrate for improvement of wavelength resolution. The grating as claimed at the filing of the invention was fixed to the substrate of the monochromator with the function of diffracting light. No thermal or material properties of the grating were reasonably conveyed at the time of filing.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. The term "smallest possible" in **claim 11** is a relative term that renders the claim indefinite. The term "smallest possible" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. "Smallest possible" is a term that is unclear as to the breadth of its value; it is unclear as to the value(s) of the "smallest possible" coefficient of linear expansion, and therefore, the term is indefinite.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. **Claims 1-5, and 9** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Minami (JP 08292096)** in view of **Rogers (6,118,583)**.

Minami discloses a monochromator comprising:

an optical ray input section that limits the width of optical rays input from a light source (Fig. 1, **3**); a first concave mirror (Fig.1, **4**); a diffraction grating (Fig. 1, **5**); a second mirror (Fig. 1, **6**); an optical ray output section which limits a wavelength bandwidth of the condensed rays (Fig. 1, **7**); a substrate to which the optical ray input

section, the first concave mirror, the diffraction grating, the second concave mirror, and the optical ray output section are fixed (Fig. 1, **1**).

Minami does not disclose the concave mirrors having coefficients of linear expansion being approximately the same as the coefficient of linear expansion of the substrate. However, Rogers teaches that the mirrors of the optical system together with the support structure be made of materials with the same coefficient of thermal expansion, in order for the optical system to be inherently athermalized (col. 2, lines 3-10). It would have been obvious to one skilled in the art to have the coefficients of linear expansion of the mirrors' focal length approximately equal to the coefficient of linear expansion of the substrate, for it is well known in the art to have optical components and their supporting structures of an optical system have the same coefficient of thermal expansion, in order to have an inherently athermalized optical system.

As to **claim 2**, Minami discloses everything as above in view of Rogers (see **claim 1**). Minami does not disclose the absolute value of the difference between the coefficients of linear expansion of the material forming the substrate and the concave mirrors being the absolute value of $d/(4aL\Delta T)$ or less. However, Rogers teaches that the mirrors of the optical system together with the support structure be made of materials with the same coefficient of thermal expansion, in order for the optical system to be inherently athermalized (col. 2, lines 3-10). It would be obvious to one skilled in the art that the absolute value of the difference between the coefficients of linear expansion of the material forming the substrate and the concave mirrors being the absolute value of $d/(4aL\Delta T)$ or less. By having the mirrors and base plate made of materials with the same coefficient of thermal expansion, in order to have an athermal system, the absolute difference will be zero, the absolute value of $d/(4aL\Delta T)$ or less.

As to **claim 3**, Minami discloses everything as above in view of Rogers (see **claim 1**). Minami does not disclose a difference between the coefficient of linear expansion of the material forming the substrate and the coefficients of linear expansion of the focal lengths of the first and second concave mirrors as being 10×10^{-6}/degrees Celsius or less. However, Rogers teaches that the mirrors of the optical system together with the support structure be made of materials with the same coefficient of thermal expansion, in order for the optical system to be inherently athermalized (col. 2, lines 3-10). It would be obvious to one skilled in the art that the difference between the coefficients of linear expansion is 10×10^{-6}/ degrees Celsius or less. By having the mirrors and substrate made of materials with the same coefficient of thermal expansion, in order to have an athermal system, the coefficients of linear expansion are exactly the same for the base plate and the mirrors. Therefore, the difference will be zero, which is less than 10×10^{-6}/degrees Celsius.

As to **claim 4**, Minami discloses everything as above in view of Rogers (see **claim 1**) except for the material forming the substrate being a composite of aluminum and ceramic. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the material forming the substrate to be a composite of aluminum and ceramic, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of an obvious design choice. In re Leshin, 125 USPQ 416.

As to **claim 5**, Minami discloses everything as above in view of Rogers (see **claim 1**). In addition, Minami discloses at least one of the optical ray input section and the optical ray output section is a slit (Fig. 1, **3**, **7**).

As to **claim 9**, Minami discloses a spectroscope comprising the monochromator as according to claim 1 in view of Rogers (see **claim 1**).

10. **Claims 6-8 and 10** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Mori et al. (6,166,805)** in view of **Tondello et al. (4,254,335)** and further in view of **Rogers (6,118,583)**.

As to **claim 6**, Mori discloses a monochromator system comprising: a slit for both entrance and exit of optical rays; a concave mirror, and a diffraction grating wherein the concave mirror condenses the rays when the rays are input and the slit limits a wavelength band of the optical rays (Fig. 4). Mori is silent concerning the optical components fixed to a substrate. Tondello teaches in a spectrograph-monochromator system to fix all the optical components to the same base plate for easy access to the components and for overall small size (col. 3, lines 35-50). It would be obvious to one skilled in the art at the time the invention was made to have the monochromator comprise a substrate whereas all the optical components are fixed in order to provide compactness and easy access to the components.

Mori in view of Tondello are silent concerning coefficients of linear expansion. However, Rogers teaches that the mirrors of the optical system together with the support structure be made of materials with the same coefficient of thermal expansion, in order for the optical system to be inherently athermalized (col. 2, lines 3-10). It would have been obvious to one skilled in the art to have the coefficients of linear expansion of the mirrors' focal length approximately equal to the coefficient of linear expansion of the substrate, for it is well known in the art to have optical components and their supporting structures of an optical system have the

same coefficient of thermal expansion, in order to have an inherently athermalized optical system.

As to **claim 7**, Mori discloses everything as above in view of Tondello and further in view of Rogers (see **claim 6**). Mori in view of Tondello does not disclose the absolute value of the difference between the coefficients of linear expansion of the material forming the substrate and the concave mirrors being the absolute value of $d/(4aL\Delta T)$ or less. However, Rogers teaches that the mirrors of the optical system together with the support structure be made of materials with the same coefficient of thermal expansion, in order for the optical system to be inherently athermalized (col. 2, lines 3-10). It would be obvious to one skilled in the art that the absolute value of the difference between the coefficients of linear expansion of the material forming the substrate and the concave mirrors being the absolute value of $d/(4aL\Delta T)$ or less. By having the mirrors and base plate made of materials with the same coefficient of thermal expansion, in order to have an athermal system, the absolute difference will be zero, the absolute value of $d/(4aL\Delta T)$ or less.

As to **claim 8**, Mori discloses everything as above in view of Tondello and further in view of Rogers (see **claim 6**) except for the material forming the substrate being a composite of aluminum and ceramic. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the material forming the substrate to be a composite of aluminum and ceramic, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of an obvious design choice. In re Leshin, 125 USPQ 416.

As to **claim 10**, Mori discloses a double pass monochromator system comprising the monochromator as according to claim 6 in view of Tondello and further in view of Rogers (see **claim 6**).

11. **Claim 11** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Minami (JP 08292096)** in view of **Rogers (6,118,583)** and further in view of **Shuma (4,758,090)**.

As to **claim 11**, Minami in view of Rogers discloses everything as above (see **claim 1**). Rogers teaches that the mirrors of the optical system together with the support structure be made of materials with the same coefficient of thermal expansion, in order for the optical system to be inherently athermalized (col. 2, lines 3-10). This includes a grating for an alternate system of Rogers comprises a lens with a diffracted surface in an athermalized system (col. 2, lines 55-67; col. 3, lines 3-12). However, the actual coefficient of linear expansion of the grating is not disclosed. Schuma in a optical wavelength monitor system discloses the grating be of an ultra-low expansion material in order to have good thermal stability (col. 6, lines 40-52). Therefore, it would be obvious to one skilled in the art to have the grating have an ultra-low coefficient of thermal expansion in order to have good thermal stability.

Response to Arguments

12. Any arguments pertaining to **claims 6-8 and 10** have been considered but are moot in view of the new ground(s) of rejection.

As to applicant's argument that Rogers is not directed to a monochromator and the components are not the same and therefore is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied

upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, both Rogers and Mori are optical systems with similar components. Rogers even has an embodiment comprising a diffracted lens, a grating, that is incorporated into an athermalized system (col. 2, lines 55-67; col. 3, lines 3-12). In addition, the system of Rogers does fall within infrared to visible ranges (col. 3, lines 60-67; col. 4, lines 1-15).

As for the arguments that Minami in view of Rogers is insufficient in addressing the thermal expansion of the grating, these arguments are not persuasive for the thermal expansion of the grating is not claimed. And Rogers does teach an athermalized system comprising a grating such as a diffracted surfaced lens.

As for the argument concerning the inability to anticipate resolution change due to ambient temperature changes, it is noted that the features upon which applicant relies (i.e., resolution changes from ambient temperature changes) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In addition, the argument in regards to the coefficient of linear expansion varying according to each component is not persuasive. In regards to Minami in view of Rogers, by having the components have similar coefficients of thermal expansion in order to athermalize the system, the limitations are met by Minami in view of Rogers, for the limitations concern the coefficients of the lens and the substrate solely.

As for the argument concerning the materials used, Rogers discloses having the mirrors be made from a material which is the same or which has the same coefficient of thermal expansion as that forming the support structure. Aluminum is a suggestion. As for preferred materials, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the materials forming the substrate and the mirrors to be of a material of the same coefficient of linear expansion, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of an obvious design choice. *In re Leshin, 125 USPQ 416.*

And as to the difficulty of matching a material with another in regards to the coefficient of thermal expansion, it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch, 617 F. 2d 272, 205 USPQ 215 (CCPA 1980)*

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure

U.S. Patent 3,391,600 to Blumentritt et al. (Specifically, this reference teaches a slit that is both an entrance and exit slit in a monochromator system (col. 1, lines 39-44; col. 2, lines 15-20))

U.S. Patent 5,166,747 to Schroeder et al. (Specifically, this reference teaches having optical elements being comprised of similar material in order to have identical thermal expansion (col. 5, lines 45-55))

Fax/Telephone Numbers

If the applicant wishes to send a fax dealing with either a proposed amendment or a discussion with a phone interview, then the fax should:

1) Contain either a statement "DRAFT" or "PROPOSED AMENDMENT" on the fax cover sheet; and

2) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

Papers related to the application may be submitted to Group 2800 by Fax transmission. Papers should be faxed to Group 2800 via the PTO Fax machine located in Crystal Plaza 4. The form of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Machine number is:

(703) 308-7722

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gordon J. Stock whose telephone number is (703) 305-4787. The examiner can normally be reached on Monday-Friday, 10:00 a.m. – 6:30 p.m.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

gs
December 18, 2002

Zandra V. Smith
Primary Examiner
Art Unit 2877